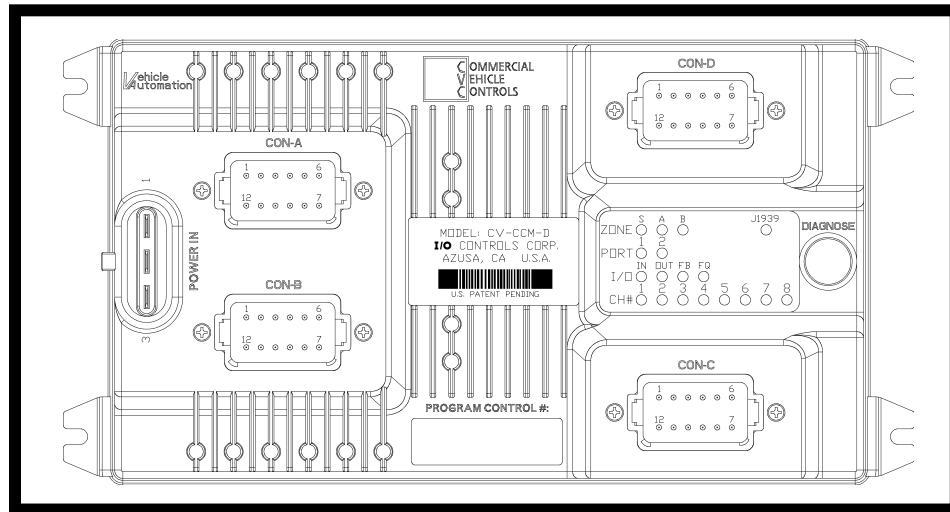


Introduction To CV-CCM-D Troubleshooting Guide

04-28-10 PRELIMINARY NEEDS PICTURE



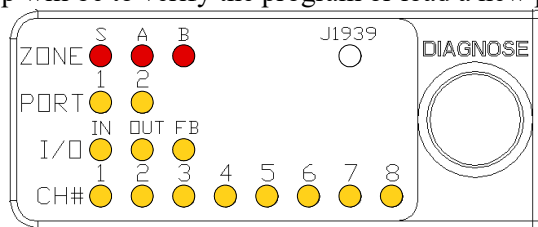
The I/O Controls “Commercial Vehicle” CV-CCM-D is presently being incorporated into a vehicle along with a subordinate module CV-ICM-1515-01. The CV-CCM-D has a built in pushbutton switch and some LEDs for display. These LEDs are known as the “Diagnostic LEDs”.

The standard I/O Controls DIO unit is based on the eight bit byte. Each DIO sub-unit has eight inputs, eight outputs, and eight feedback points. There are eight amber LEDs on the CV-CCM-D that can show the state of inputs, outputs, and feedback channels. During troubleshooting, the mechanic may proceed by selecting a group of eight and then observing the amber LEDs. The mechanic must look at the ladder logic diagram and also check the DIO inputs by observing the LEDs. This troubleshooting guide will help the mechanic to follow a troubleshooting procedure step by step.

In general, the procedure is the same for each vehicle. The first idea is to toggle through each of the input displays so as to look at each DIO unit input. It is not always convenient to open each panel and observe each DIO module while troubleshooting the vehicle. Therefore I/O Controls is providing another alternative. In the CV system, looking at the CV-CCM-D that is conveniently mounted in the vehicle cockpit may perform all of the LED observations.

Power-On Display Characteristics: Normal Mode Of Operation

On power-up, all of the Diagnostic LEDs on the CV-CCM-D will be on. If the CV-CCM-D has a vehicle program installed, then the LED's will soon turn off. If these LEDs remain on, then the next step will be to verify the program or load a new program into the CV-CCM-D.



(No Program Loaded)

Software Revision Flash Code: The LED labeled Zone A will flash on and off a specific number of times. If the software is ‘Revision A’ then the Zone A lamp will flash on and off one time. If

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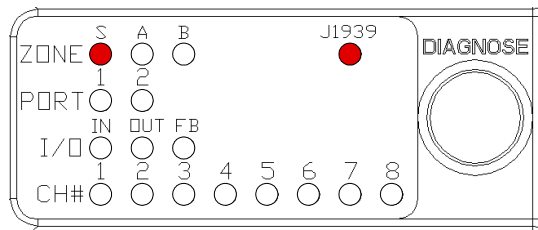
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the software is 'Revision B' then the Zone A lamp will flash on and off two times. 'Revision Z' will show twenty-six flashes. The number of times that the Zone A lamp flashes on and off will be an indication of which version of the software has been loaded onto the CV-CCM-D.

The top row of LEDs consists of four red LEDs labeled ZONE S, A, B, J1939. The LEDs A and B represent the two zones in a commercial vehicle multiplex system during troubleshooting mode only. During normal operation the S LED is indicating the sleep mode status is Awake.

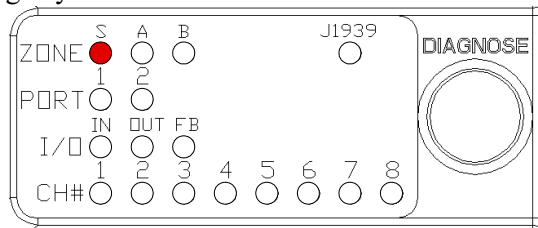
J1939 Lamp.

If the module is awake and the J1939 LED is on, this indicates that the CV-CCM-D is receiving data over the J1939 databus.



(Receiving J1939 Data in Normal Mode)

If the module is awake and the J1939 LED is OFF, this indicates that the CV-CCM-D is not receiving any data over the J1939 databus.



*(**NOT** Receiving J1939 Data in Normal Mode)*

Normal Mode and Sleep Mode.

Normal mode occurs when the Ignition Switch is ON. The Ignition Switch is the A2 module input 4. The left-turn and right-turn switches working together activate the hazard flashers. If Ignition Switch is ON, or if both the Turn Signal Switches are ON then the Dinex module will function according to the CV-CCM ladders of logic. During this time the ZONE A and B LEDs will be off.

Refer to ladder logic diagram MB-D02 to see all of the inputs which can keep the module awake.

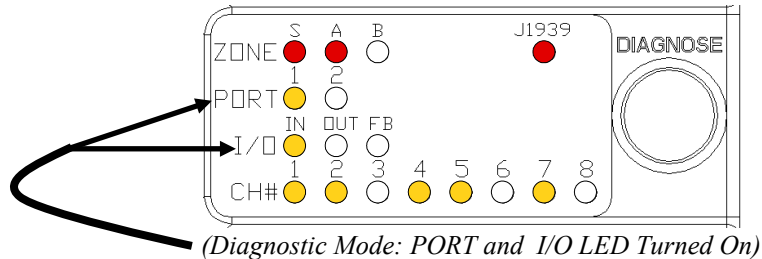
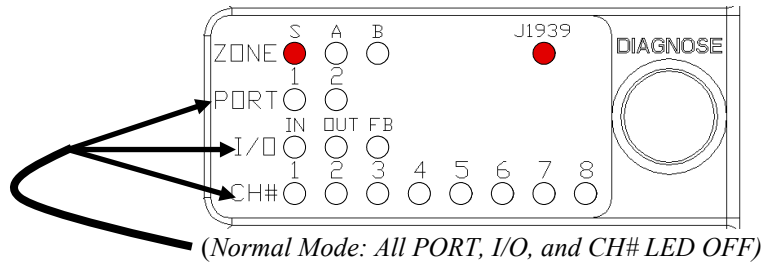
However, if the Ignition Switch is OFF and the hazard flashers are OFF (etcetera), then the sleep timer will be running. This delay time is coded in software within the CV-CCM-D. During this delay time the Zone A and B LEDs will be off, and all of the other LEDs will remain off. If any other LEDs are on, other than the Zone A or Zone B LEDs then this is an indication of troubleshooting mode rather than sleep delay time.

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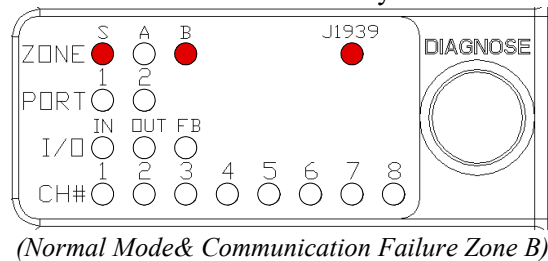


Sleep Mode happens after the Ignition Switch and the Hazard Flashers (etcetera) have been off for a time exceeding 54.4 minutes. At this point, all of the CV-CCM-D outputs will turn off in order to save the battery power.

Wake-up happens when the Ignition Switch is turned on, or when the Hazard Flashers are turned on (etcetera). The CV-CCM-D will 'wake up' and once again function according to the CV-CCM ladders of logic. Caveat is the CV-CCM-D will not enter sleep mode during 'Force Points' operation.

Normal Operation.

During regular operation, if the CV-ICM-1515-01 becomes disconnected from the CV-CCM-D then the Zone B LED will turn on steady.



Detailed Observations Of Each Sub-Unit: Troubleshooting Mode.

The CV-CCM-D module contains a momentary contact switch called "DIAGNOSE". (This input is not shown in the ladder logic). The mechanic may press this switch repeatedly to step through a display of each DIO sub-unit. In this mode, one of the top row LEDs Zone A or B will be on while the others are off. If there is a communication failure in this mode then the LED will flash. If communication is OK then the LED will remain steady on.

The second row of LEDs is red. The second row of LEDs consists of two red LEDs labeled PORT 1, 2. During troubleshooting mode, one of these LED's will be lighted to indicate which sub-unit has been selected. Each time that the "DIAGNOSE" is pressed, the next eight bits of each sub-unit will be selected. A final selection will go back to normal mode of operation. For

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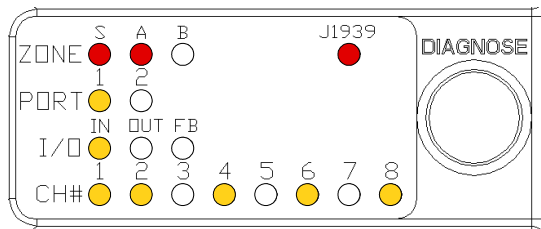
the rolling chassis the A zone sub units 1, and 2 are available. For a finished vehicle the existing sub units of A zone, and B zone, are available.

The third row of LEDs is amber. When a sub unit has been selected, and the IN remains lit, then the next row of amber LEDs will show the actual state of that sub-unit's 8 inputs in real time.

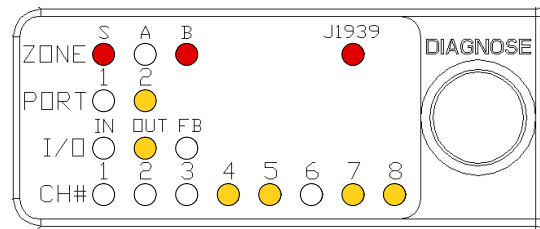
The third row of LEDs is amber. When a sub unit has been selected, and the OUT remains lit, then the next row of amber LEDs will show the actual state of that sub-unit's 8 outputs in real time.

The third row of LEDs is amber. When a sub unit has been selected, and the FB remains lit, then the next row of amber LEDs will show the actual state of that sub-unit's 8 feedback inputs in real time. The feedback inputs are a way for I/O Controls to show continuity on the DIO output when the output is turned off.

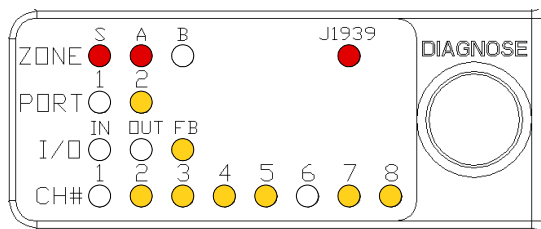
The troubleshooting guide follows a step-by-step guide to observing those red and amber LEDs during troubleshooting. This Troubleshooting Mode of operation is harmless. The vehicle may be driven over the road in Troubleshooting Mode with no ill effects.



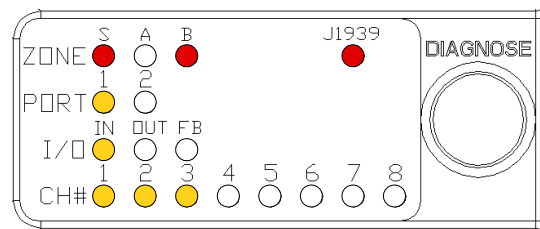
(Diagnostic Mode For A1 Inputs)



(Diagnostic Mode For B2 Outputs)



(Diagnostic Mode For A1 Feedback)



(Diagnostic Mode For B1 Inputs)

Press the “DIAGNOSE” five times to light the Zone A, Port 2, OUT LED's. Compare the output LED's with the actual 8 outputs from the 'A2 ID #69' connector. Is there an output, which shows that it is on according to the diagnostic LED's, but it is not actually working? If so, that may be the short circuit that is causing the fault.

Press the “DIAGNOSE” three times to light the Zone B, Port 1, OUT LED's. Compare the output LED's with the actual 8 outputs from the 'B1 ID #71' connector. Is there an output, which shows that it is on according to the diagnostic LED's, but it is not actually working? If so, that may be the short circuit or blown fuse that is causing the fault.

Press the “DIAGNOSE” three times to light the Zone B, Port 2, OUT LED's. Compare the output LED's with the actual 8 outputs from the 'B2 ID #72' connector. Is there an output, which shows that it is on according to the diagnostic LED's, but it is not actually working? If so, that may be the short circuit or blown fuse that is causing the fault.

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It is important to note that the short-circuited output will not come back to life until the output is turned off, then on again. First refer to the ladder of logic then manipulate the input switches so as to turn the output off, then on again.

Example Keep-Awake Ladder Rung Subject to change, preliminary.



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